



Center for  
Environmental  
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Statistics

US Environmental  
Protection  
Agency

# Major Findings from the CEIS Review of EPA'S

## TOXICS RELEASE INVENTORY (TRI) DATABASE

August 5, 1998

DRAFT



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## Executive Summary

The Toxics Release Inventory (TRI) is a major EPA database tabulating the releases of toxic chemicals into the environment. Developed as part of the Emergency Planning and Community Right to Know Act of 1986, the TRI is the first EPA database planned, designed, and operated for public access. It is also one of the few EPA databases operated centrally at EPA headquarters, with all inputs arriving to one location for processing.

TRI stores the information that is self-reported annually from industries that conduct manufacturing operations within certain specified standard industrial classification codes (SIC Codes 20-39 until the 1998 reports, as to which additional sectors have been added). In addition to industrial classification, facilities are only required to report if they manufacture or process more than 25,000 pounds of a listed chemical during a year, or otherwise used more than 10,000 pounds, and have the equivalent of more than 10 full-time employees. They must report the on-site releases of toxic chemicals into the air, water, and land; and quantities treated, combusted for energy recovery, and recycled on-site. They also report on transfers of wastes that are disposed, treated, combusted for energy recovery, or recycled at a separate facility. Approximately 650 chemicals have been designated for reports under TRI. In all about 73,000 reports are submitted annually by 21,000 manufacturing facilities and 200 Federal facilities in 1996.

The inventory represents the first real attempt to quantify toxic chemical pollution. Congress stipulated the types and sizes of industry that had to report. In general, reports are received from the largest chemical manufacturers, although many non-industrial sources contribute to toxic pollution (e.g. dry-cleaners, and mobile sources such as cars) and these are not reported under TRI. Also, reports are in many cases estimates of the pollution, since actual monitored data are required only if available. Most of the entities report estimates. Since the reporting is annual, there is no accounting for changing levels of toxic releases. The total release could have occurred all in one day, or occurred evenly throughout the year. TRI requires considerable information from facilities to link them with identifiers from other programs. This includes their Dun & Bradstreet, RCRA, and NPDES identification.

TRI is handled centrally, so the extensive quality controls are easier to apply, affording good assurance that what is reported actually makes it to the database. Every facility reports for each chemical using the same form, except for facilities that certify that they do not exceed a threshold of 500 pounds of the chemical released, treated, or transferred, and do not manufacture, process, or use more than one million pounds of the listed chemical. Input forms are checked for completeness, valid formats, chemical identification numbers, and internal consistency. Additionally, electronic submission of forms is another attempt to reduce the number of possible transcription errors. EPA sends out reports showing all the release for a submitter's own review, so that facilities which have reported have the opportunity to verify their data. EPA also conducts inspections and training to raise the quality of the reported data.

TRI is an expanding program and since its inception has increased the coverage of the reporting universe and reported chemicals. As a result, depending on the particular spatial or temporal analysis, some caution is advised in using TRI data exclusively.

## 1. INTRODUCTION

The **Toxics Release Inventory (TRI)** is a key feature of the landmark **Emergency Planning and Community Right to Know Act (EPCRA)** of 1986. EPCRA was enacted to promote emergency planning, to minimize the effects of accidental large releases of chemicals and to provide public with information on releases of toxic chemicals in their communities. Section 313 of EPCRA established the Toxic Release Inventory (TRI) Program that identifies facilities, chemicals manufactured and used in the identified facilities, and the annual amounts of these chemicals released and managed on and off site in waste. Under the same section, a national database was established to maintain the TRI information for public use. The Office of Prevention, Pesticides and Toxic Substances of EPA is responsible for the TRI Program and the maintenance and administration of the TRI database.

TRI is one of the twelve major EPA databases that are being reviewed to characterize their suitability for secondary uses. An overview of the project is included in Appendix A.

## 2. SUMMARY ANSWERS TO REVIEW QUESTIONS

### A - Z

#### 2.1. How comprehensive is the database?

Each year, since 1987, facilities that meet certain thresholds must report their releases (to air, land and water both on- and off-site) and other waste management activities for listed toxic chemicals to EPA and to the State or Tribal entity in whose jurisdiction the facility is located. The TRI program started with a list of 331 chemicals which, after periodic updates, has grown to 643 chemicals in 1996. The list is fluid as chemicals are added or delisted according to the toxicity criteria outlined in EPCRA. Sixteen chemicals have been delisted since 1987. The largest increase to the list was instituted for the 1995 reporting year when 286<sup>1</sup> chemicals were added to the TRI list. Many of these chemicals have been identified as of concern under the Clean Air Act, the Clean Water Act, the Safe Drinking Water Act, the Federal Insecticide, Fungicide, and Rodenticide Act, and the Resource Conservation and Recovery Act.

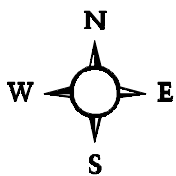
Originally, reporting was limited to manufacturing facilities within Standard Industrial Classification (SIC) codes 20 through 39; which have 10 or more full time equivalent employees; and manufacture or process more than 25,000 pounds or otherwise use more than 10,000 pounds of any listed chemicals during the calendar year are required to report to the TRI program. The universe of reporting facilities was expanded to include Federal facilities. In 1993, a Presidential Executive Order mandated Federal facilities to report to TRI starting with the 1994 reporting year. EPA has further expanded the reporting universe starting with the reporting year 1998 to include metal and coal mining, electric utilities, hazardous waste treatment and disposal facilities, chemical and allied products wholesale distributors, petroleum bulk stations and terminals and solvent recovery services.

TRI is an expanding program, providing information on on-site and off-site releases of most of the major industrial chemicals to air water and land. In 1996, the TRI program reported<sup>2</sup> air emissions of 1.45 billion pounds which accounted for approximately 60% of all releases. While TRI reports the releases from sectors that are mandated under the law, the sources of toxic releases go far beyond the industrial sector. For example, at present, TRI does not report releases from mobile sources, area (non-point)sources, and non-manufacturing point sources and thus does not comprehensively report on releases of all air toxics. The Office of Air Quality Planning and Standards (OAQPS) maintains information on air toxics from mobile, area and point sources in the National Toxics Inventory (NTI). Point sources account for about 23% of all air toxic emissions and TRI data represent less than half this category (National Air Quality and Trends Report, 1996).

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<sup>1</sup> Since some of these chemicals were not reported individually but as members of chemical compound categories, the number of chemicals added to the TRI in 1995 was 245.

<sup>2</sup> See 1996 Toxic Release Inventory, Public Data Release, p. 25



## 2.2. Can the database be used for spatial analysis?

The TRI database contains information about the location of a facility. Besides address of a facility, information on EPA Region, State, county, ZIP code and latitude and longitude is available. TRI data have been used to analyze spatial issues including environmental justice issues. In using TRI data for spatial analyses, some caution should be exercised due to the following reasons:

- Potential errors and approximations exist in the latitude and longitude reported by facilities. The TRI program provides ‘preferred’ latitude and longitude for users. Sometimes, ‘preferred’ latitude and longitude may be inconsistent with the ZIP code and users may want to verify the information for analyses at ZIP code level.
- Variations in reported releases and transfers of waste between facilities can result from different estimation methodologies. Where TRI chemicals are monitored, facilities are required to consider the monitored data. Where no monitoring data are available, the statute allows facilities to provide reasonable estimates (subject to enforcement and verification).
- Facilities may also vary in reporting waste management data due to varying interpretations of reporting requirements that have not yet been specifically defined in final rule making.



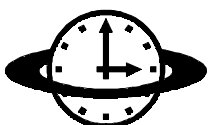
## 2.3. Can the database be used for temporal analysis?

TRI data are collected annually for many of the same variables since 1987 and provide a rich source of information for analyses over time. However, since TRI is a growing program, a number of things, such as the list of covered industry groups, list of chemicals and reporting requirements have changed over time. Of course, the impact of changes depend upon the type of temporal analysis performed. The following factors should be considered in conducting temporal analyses with TRI data:

- The reporting thresholds changed during the first two years of the program, 1987-89. Manufacture and process thresholds began at 75,000 pounds for 1987, dropped to 50,000 for 1988, and to 25,000 pounds for 1989 and thereafter. Since 1989, the definition of reporting facilities has remained unchanged.
- In 1993, The President issued an Executive Order requiring Federal facilities to report to TRI program starting from the reporting year 1994.
- Beginning with the 1991 reporting year, in addition to off-site transfers for treatment and disposal, facilities were required to report on additional waste management activities including transfers off-site for the purposes of recycling and energy recovery.
- Beginning with the reporting year 1995, to reduce reporting burden on facilities, Form A was introduced. If a facility does not exceed the total production-related waste amount of 500 pounds, and does not manufacture, process or otherwise use more than one million pounds of the listed chemical, the facility does not have to fill a Form R and can instead submit a certification statement, Form A, for the listed chemical.
- The chemical list is fluid where chemicals can be added or delisted according to the toxicity criteria outlined in EPCRA. The list has grown from 351 chemicals in 1987 to 643 chemicals in 1996. This means that the

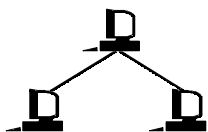
chemicals which are reported every year or ‘core chemicals’ can be analyzed over a period of time.

- Changes in reporting requirements for ammonia, hydrochloric acid and sulfuric acid make it difficult to use them for temporal analyses. Non-aerosol forms of hydrochloric and sulfuric acid have been removed from the list. Over time these list changes will lessen in significance, and temporal analysis of the post-change data will be possible and meaningful.
- While TRI information is available annually from 1987 to 1996, the quality of 1987 data was lower than in subsequent years, and therefore should not be used for temporal analyses.



#### **2.4. How consistent are the variables over space and time?**

TRI is a national program and is not delegated to States. Thus information on the same variables is collected for all facilities during a particular reporting year. However, as the program has expanded, some of the variables have changed over the years.



#### **2.5. Can data from TRI be linked with information from other databases?**

TRI includes latitude/longitude information, Chemical Abstract Service (CAS) numbers to identify chemicals, standard facility identifiers, and Federal Information Processing Standards (FIPS) codes for States and counties. TRI also contains Resource Conservation and Recovery Information System (RCRIS) and National Pollution Discharge Elimination System (NPDES) identification numbers when applicable. These identifiers allow linkage with other databases.



#### **2.6. How accurate are the data in TRI?**

The TRI program issues guidance to assist facilities in reporting their data. This reduces “reporting errors” before they are made. In addition, EPA runs computer checks against the reported data where potential errors are identified, and facilities are notified to allow for correction. Audits reveal a very low rate of data transcription errors as well. The Agency has conducted data quality site surveys covering reporting years 1987, 1988, 1994, and 1995 to determine the accuracy of the actual data reported by the regulated community. These surveys concentrated on certain particular SIC codes. The surveyors examined the estimation calculations and data sources and then recalculated the release and waste management estimates. They did not conduct any monitoring or measurements during the site visit. In general, on-site releases and off-site transfers for waste management were fairly accurate; but there were larger discrepancies in fugitive emission estimates, and various differences in industry vs. surveyor estimates of emissions.



#### **2.7. What are the limitations of TRI?**

TRI is an expanding program and since its inception has increased the coverage of the reporting universe and reported chemicals. As a result, depending on the particular spatial or temporal analysis, some caution is advised in using TRI data exclusively.

The TRI program provides invaluable information to the public, industry, local, State and Federal governments on loadings of many toxic chemicals in the environment. There are, however, some limitations to these data which must be considered when using the data. Some of these limitations, as discussed above, affect spatial and temporal analyses. Although the TRI program covers the manufacturing sector, Federal owned facilities, and has expanded to the energy sector, mining, and waste treatment and disposal facilities, it does not cover area sources and non-point sources. In addition, facilities which do not meet the TRI threshold are not required to report. As a result, on- and off-site releases reported by TRI represent only a portion of all toxic chemicals released nation wide.

The TRI program does not mandate that all facilities monitor chemical releases for reporting. Where TRI chemicals are monitored, facilities must consider the monitored data. Where no monitoring data are available, facilities must provide reasonable estimates based on varying estimation methods. Variations between facilities can result from the use of different estimation methods.

The release estimates alone are not sufficient to determine exposure or to calculate adverse effects to human health and environment. TRI data, in conjunction with other information, can be used as a starting point to determine exposure that may result from releases and other waste management activities of toxic chemicals. The determination of potential risk depends on many factors including the toxicity of the chemical, the fate of the chemical after it is released, the amount of the chemical which is released at a time and the exposure to the chemical.



## 2.8. How can I get information on TRI?

TRI data are provided in a number of formats, including CD-ROM, computer diskette, hardcopy (i.e. paper), and electronically by way of the EPA website. TRI data can also be accessed electronically on the Right to Know Network (RTK NET) and through the National Library of Medicine TOXNET System.

### TRI Reports and Data Products

Product	Supplier/Contact/Order Information
1996 TRI Public Data Release (annual report)	NCEPI (800) 490-9198 Also available at <a href="http://www.epa.gov/opptintr/tri/access.htm">www.epa.gov/opptintr/tri/access.htm</a> EPA 745/R-98-005 (FREE)
1996 State Fact Sheets	NCEPI (800) 490-9198 Also available at <a href="http://www.epa.gov/opptintr/tri/access.htm">www.epa.gov/opptintr/tri/access.htm</a> EPA 745/F-98-001 (FREE)
TRI Information Kit	NCEPI (800) 490-9198 EPA 749-K-98-001 (FREE)
1987 - 1995 TRI CD-ROM	US GPO (202) 512-1800 S/N 055-000-00582-6 (\$43) NTIS (703) 487-4650 / (800) 553-6847 PB 97-502-587 (\$45)
1996 State Data Files (dBASE, Lotus)	US GPO (202) 512-1530 \$15 - \$25 / State <a href="http://www.epa.gov/opptintr/tri/disks96.htm">www.epa.gov/opptintr/tri/disks96.htm</a>
1995 Federal Facilities on Disk (dBASE)	US GPO (202) 512-1530 \$15 - \$25 <a href="http://www.epa.gov/opptintr/tri/disks96.htm">www.epa.gov/opptintr/tri/disks96.htm</a>

## Accessing TRI Data Online

Data from Online Providers/Internet Site	For More Information
<b>EPA Internet Server</b> - Access a variety of reports, data files, and TRI information from EPA. <a href="http://www.epa.gov/enviro/html/tris/tris_overview.html">http://www.epa.gov/enviro/html/tris/tris_overview.html</a> <a href="http://www.epa.gov/opptintr/tri">http://www.epa.gov/opptintr/tri</a>	TRI-US Telephone (202) 260-1531
<b>National Library of Medicine (NLM)</b> offers state of the art, user-friendly searching of the complete TRI database. toxnet.nlm.nih.gov (\$18 - \$20/hour. Password required.)	Telephone (301) 496-6531
<b>Right to Know Network (RTK NET)</b> - Provides public access to TRI. <a href="http://www.rtk.net">http://www.rtk.net</a>	Telephone (202) 797-7200



### 2.9. Is there documentation on TRI?

A substantial amount of documentation on TRI is available from the Office of Pollution Prevention and Toxics, Office of Prevention, Pesticides and Toxic Substances, EPA.

# A - Z

## Standard Industrial Classification (SIC) Codes

- 20 Food and kindred products
- 21 Tobacco products
- 22 Textile mill products
- 23 Apparel and other finished products made from fabrics and other similar material
- 24 Lumber and wood products, except furniture
- 25 Furniture and fixtures
- 26 Paper and allied products
- 27 Printing, publishing, and allied industries
- 28 Chemical and allied products
- 29 Petroleum refining and related industries
- 30 Rubber and miscellaneous plastic products
- 31 Leather and leather products
- 32 Stone, clay, glass, and concrete products
- 33 Primary metal industries
- 34 Fabricated metal products, except machinery and transportation equipment
- 35 Industrial and commercial machinery and computer equipment
- 36 Electronic and other electrical equipment and components, except computer equipment
- 37 Transportation equipment
- 38 Measuring, analyzing, and controlling instruments; photographic, medical, and optical goods; watches and clocks
- 39 Miscellaneous manufacturing industries

## 3. DETAILED ANSWERS TO REVIEW QUESTIONS

### 3.1. How comprehensive is the database?

#### Who Must Report?

Each year, manufacturing facilities meeting certain requirements must report to EPA and to the State or Tribal entity in whose jurisdiction the facility is located with respect to their releases and transfers of toxic chemicals.

Facilities, both private and Federal, that must report data to the TRI program include those meeting these three criteria:

- conduct manufacturing operations within Standard Industrial Classification (SIC) codes 20 through 39 (or Federal facilities in any SIC code), and
- have the equivalent of 10 full-time workers, and
- manufacture or process more than 25,000 pounds (down from 75,000 pounds in 1987 and 50,000 pounds in 1988) or otherwise use more than 10,000 pounds of any listed toxic chemical or chemical category during the calendar year.

Beginning with data to be collected in 1998, coverage will be expanded to include the following seven sectors:

- Metal mining (SIC code 10 except for SIC codes 1011, 1081, and 1094)
- Coal mining (SIC code 12 except for extraction activities)
- Electrical utilities that combust coal and/or oil (SIC codes 4931 and 4939)
- Resource Conservation and Recover Act (RCRA) Subtitle C hazardous waste treatment and disposal facilities (SIC code 4953)
- Chemicals and allied products wholesale distributors (SIC code 5169)
- Petroleum bulk plants and terminals (SIC code 5171)
- Solvent recovery services (SIC code 7389)

#### How are data reported?

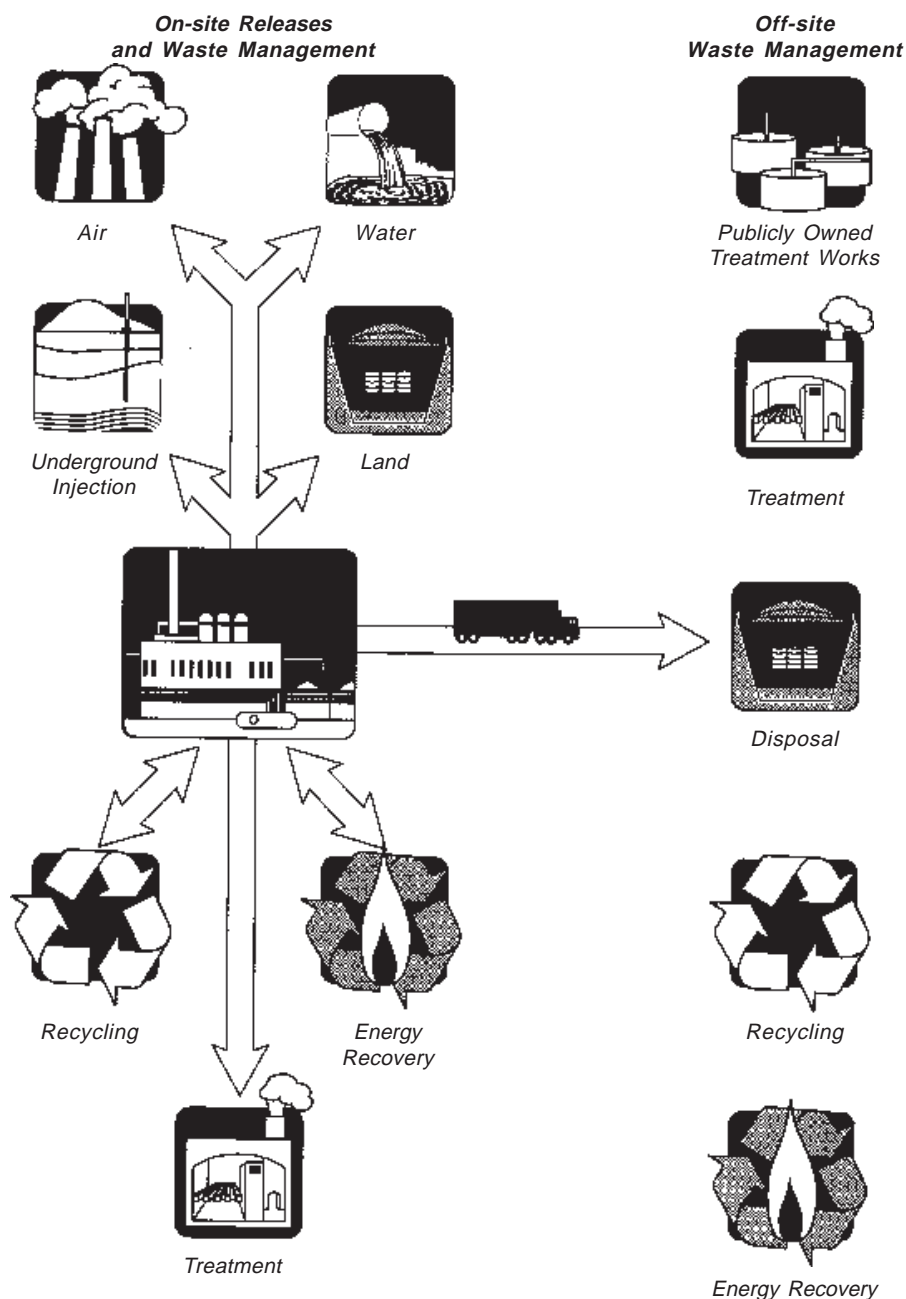
Facilities satisfying the above requirements are required to report their emissions on a standardized Form R. TRI data are self-reported and may be submitted either electronically or on paper. The EPA added an alternative certification track in 1995 for smaller entities. Facilities with production-related waste of less than 500 pounds which manufacture, process, or use less than one million pounds of a listed chemical, may now file a Certification Statement (Form A). A facility filing a Certification Statement must report its name, address, and the name(s) of chemicals in use; however, it does not have to reveal information about releases, transfers, or waste.

#### Information Coverage

Facilities are required to report information on releases, and other waste management and source reduction activities. A release is an on-site or off-site discharge of a toxic chemical to the environment. This includes emissions to the air, discharges to bodies of water, releases at the facility to land, disposal on-site into underground injection wells, as well as releases off-site to land or

underground injection wells. A transfer represents movement of toxic chemicals in waste to a facility that is geographically or physically separate from the facility reporting under TRI. These chemicals are transferred for the purposes of recycling, energy recovery, treatment, or disposal. The Pollution Prevention Act of 1990 (PPA) requires facilities, starting in 1991, to report information about the quantities of TRI chemicals managed in waste, both on-site and off-site. The PPA also requires the reporting of any source reduction activities undertaken to reduce the amount of toxic chemicals which enter a waste stream or are otherwise released into the environment. The waste management information collected under the TRI program is depicted in Figure 3.1.

**Figure 3.1: Waste Management Information Collected Under TRI**



**Table 3.1: Chemicals Added to the TRI List by Year**

**1990**

Allyl alcohol  
Creosote  
2,3-dichloropropene  
m-dinitrobenzene  
o-dinitrobenzene  
p-dinitrobenzene  
Dinitrotoluene  
(mixed isomers)  
Isosafrole  
Toluene diisocyanate  
(mixed isomers)

**1991**

Bromochlorodifluoromethane  
Bromotrifluoromethane  
Dibromotetrafluoroethane  
Dichlorodifluoromethane  
Dichlorotetrafluoroethane  
Monochloropentafluoroethane  
Trichlorofluoromethane

**1994**

Chlorodifluoromethane  
Dichlorotrifluoroethane and isomers  
Chlorotetrafluoroethane and isomers  
1,1-dichloro-1-fluoroethane  
1-chloro-1,1-difluoroethane  
1-chloro-1,1,2,2-tetrafluoroethane  
2-chloro-1,1,1,2-tetrafluoroethane  
Dichloro-1,1,2-trifluoroethane  
1,1-dichloro-1,2,2-trifluoroethane  
1,2-dichloro-1,1,2-trifluoroethane  
2,2-dichloro-1,1,1-trifluoroethane  
Acetophenone  
Amitrole  
Bis(2-chloroethoxy) methane  
1,4-dichloro-2-butene  
Dihydrosafrole  
Ethylenebisdithiocarbamic acid, salts and esters  
Ethylidene dichloride  
Formic acid  
Hexachlorophene  
Hydrogen sulfide  
Malononitrile  
Methacrylonitrile  
Methyl chlorocarbonate  
Methyl mercaptan  
2-methylpyridine  
5-nitro-o-toluidine  
Paraldehyde  
Pentachloroethane  
Pronamide  
1,1,1,2-tetrachloroethane  
Thiram  
Trypan blue  
Warfarin and salts

The initial list of chemicals subject to TRI reporting numbered 331 and was compiled in 1987 from two existing chemical lists, the New Jersey Environmental Hazardous Substances List and the Maryland Chemical Inventory Report List. EPA has the authority to add and delete chemicals from this list. EPA added nine chemicals to the list in the 1990 reporting year for cancer or other chronic toxicity concerns. As a result of a petition submitted by three governors and the Natural Resources Defense Council, EPA added seven chlorofluorocarbons (CFCs) and halons beginning with the 1991 reporting year. In response to another petition, 11 hydrochlorofluorocarbons (HCFCs) were added beginning with the 1994 reporting year. Also for the same year, an additional 21 chemicals and two chemical categories that appear on the Resource Conservation and Recovery Act (RCRA) list of hazardous wastes were added to the TRI list. The largest increase to the list was instituted in the 1995 reporting year when 286 chemicals<sup>1</sup> were added to the TRI list. These chemicals include over 150 pesticides, certain Clean Air Act chemicals, certain Clean Water Act Priority Pollutants, and certain Safe Drinking Water Act chemicals. Many of these chemicals are carcinogens, reproductive toxicants, or developmental toxicants. Table 3.1 lists the chemicals added to the TRI list in 1990, 1991, and 1994. Most large production industrial chemicals are covered in this list.

EPA has also deleted seventeen individually listed chemicals (shown in Table 3.2) and three chemical categories. The chemicals deleted from categories are barium sulfate (barium compounds category); copper phthalocyanine compounds substituted with only bromine, chlorine, and/or hydrogen (copper compounds category); and high molecular weight glycol ethers by redefining the category (glycol ethers category). Listings were modified for three chemicals, ammonia, hydrochloric acid, and sulfuric acid. The reporting requirements for ammonia were changed effective 1994 reporting year. Also, ammonium sulfate and ammonium nitrate are no longer individually listed on TRI. The ammonia portion of these chemicals is reported under the ammonia listing, and the nitrates portion of the ammonium nitrate is reportable under the nitrate compounds category added in the 1995 reporting year. The non-aerosol form of hydrochloric acid was removed from the list in 1995 reporting year, while the non-aerosol form of sulfuric acid was delisted in 1994 reporting year. Currently, only airborne forms of these two acids are reported. Because of these changes in the chemical list, care should be exercised in comparative temporal analysis of releases over time for these chemicals individually, making sure to only include the same chemicals or chemical with unchanged definitions in the comparison.

Starting with the 1998 reporting year, EPA has added a number of non-manufacturing industry sectors to the TRI program. These sectors include metal mining, coal mining, electrical utilities, RCRA subtitle C hazardous waste treatment and disposal facilities; chemical and allied product wholesale distributors; petroleum bulk stations and terminals; and solvent recovery facilities. Since 1995, facilities report the quantity of 643 listed TRI chemicals or chemical categories that are released to air, water, and land or injected underground. The facilities also report on how chemical wastes were treated on-site, including the nature and efficiency of the treatment plan, and on the amount of chemicals transferred off-site for disposal, treatment, energy recovery, and recycling. For

**Table 3.2: Chemicals deleted from the TRI list**

Acetone  
 Ammonium sulfate (solution)  
 Butyl benzyl phthalate  
 Color Index Acid Blue 9 diammonium salt  
 Color Index Acid Blue 9 disodium salt  
 N-dioctyl phthalate  
 Melamine  
 Sodium hydroxide (solution)  
 Sodium sulfate (solution)  
 Terephthalic acid  
 Titanium dioxide  
 Color Index Pigment Green 36  
 Color Index Pigment Green 7  
 Ammonium nitrate (solution)  
 Methylenebis(phenylisocyanate)  
 Bis(2-ethylhexyl) adipate  
 Diethyl phthalate

reporting year 1996, approximately 21,000 different facilities filed a total of approximately 73,000 TRI reporting forms. The key variables are:

#### Identification Variables

- Facility name, address, TRI facility identification, and Dun & Bradstreet number
- Parent company name
- Public contact and technical contact name, and phone number
- TRI chemical identification and name
- Document control number
- EPA identification numbers: Resource Conservation and Recovery Information System (RCRIS) ID number, National Pollution Discharge Elimination System (NPDES) permit number, Underground Injection Well Code

#### Response Variables

- Onsite releases to air, water, underground injections, and land
- Onsite recycled, treated, energy recovery, disposed, and non-production related waste
- Offsite transfers to recycling, energy recovery, treatment, POTWs, and disposal

#### Classification Variables

- Standard Industrial Classification (SIC) code
- Federal facility

#### Temporal Variables

- Reporting year

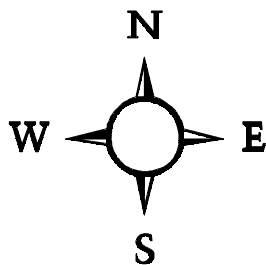
#### Spatial Variables

- City, county, State and EPA Region
- State and county FIPS codes
- ZIP code
- Latitude and longitude (reported, preferred, ZIP code centroid)

TRI is a prominent source of information on toxic releases, but is not a comprehensive source of all toxic releases. It excludes mobile sources, area sources, and non-manufacturing point sources. The Office of Air Quality Planning and Standards (OAQPS) maintains information on air toxics from mobile, area and point sources in the National Toxics Inventory (NTI). Point sources account for about 23% of all air toxic emissions and TRI data represent less than half this category (National Air Quality and Trends Report, 1996).

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<sup>1</sup> Since some of these chemicals were not reported individually but as chemical compounds, the number of chemicals added to the TRI in 1995 was 245.



### 3.2. Can the database be used for spatial analysis?

TRI contains information that can be accessed at the national, Regional, State, county, ZIP code or facility level. The spatial variables in the database are as follows:

- ZIP code
- City
- County
- State
- EPA Region
- State and county FIPS code
- Latitude and longitude

Care should be exercised in conducting spatial analysis due to a variety of reasons. There are some errors and approximations in the latitude and longitude reported by facilities. TRI attempts to rectify some of these errors by the calculation of preferred latitudes and longitudes. For this reason caution should be exercised when analyzing areas smaller than ZIP codes.

Facilities use different methods to estimate releases and other waste management. The releases and quantities otherwise managed as wastes may be based on monitored data, chemical analyses, weights of raw materials and waste shipments, flow volumes, changes in fluid levels, changes in pressures etc. Therefore, variations between facilities can result from the use of different estimation methodologies.

Facilities may also vary in their interpretation of the waste management reporting requirements under the PPA as EPA has not yet defined them in rulemaking. As a result some facilities may include amounts that other facilities do not believe they must include. Higher quantities of chemicals in waste for a particular State or industry may reflect not only differences in actual quantities, but also differences in interpretations of reporting requirements.



### 3.3. Can the database be used for temporal analysis?

Facilities are required to report on TRI chemicals on an annual basis. Trends analysis is possible as the data are available for every year from 1987 to 1995. However, the quality of 1987 data is weak, and the data should not be used for temporal analysis. As the TRI program keeps expanding to include more chemicals and sectors, there are limitations to conducting temporal analysis as listed below.

#### Listing and delisting of chemicals

Since 1987, EPA has deleted a number of chemicals from the list, added others, and modified the reporting requirements for others. The largest expansion was for the 1995 reporting year when 282 chemicals were added increasing the number on the list to 643 chemicals. Year-to-year comparisons must be based on a consistent set of chemicals to assure that changes in releases, and other

waste management do not simply reflect the addition, deletion, or change in definition of reportable chemicals from one year to another. For example, on-site recycling as a fraction of production related waste was 31.7% in 1994 and 54.4% in 1995. This was due, in large part, due to on-site recycling of n-hexane, a chemical added to the TRI list as of 1995.

#### Threshold changes

Facilities are required to report for a particular chemical only if they meet the “manufacture, process or otherwise use” thresholds for that chemical. The threshold for “otherwise use” has remained 10,000 pounds since inception. However, the manufacture and process thresholds began at 75,000 pounds for 1987, dropped to 50,000 for 1988, and dropped to 25,000 pounds for 1989 and thereafter. Some of the annual increases in the number of reporting facilities between 1987 and 1989 may be attributed to this factor. Trend analyses using data collected after 1989 are not affected by changes in threshold levels.

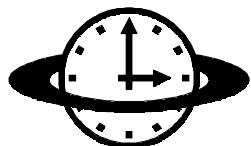
In addition, since 1995, firms with a total annual release of a reportable chemical of 500 pounds or less can submit a certification form (Form A instead of a Form R) as long as they do not manufacture, process or use more than one million pounds of the chemical. Form A identifies the facility and the chemical but does not provide information on quantities involved in release and other waste management. The introduction of Form A plays a small role in reducing the reported releases.

#### Changes in facilities

The number of facilities required to report under TRI increased following the issuance of a 1993 Executive Order that mandated that Federal facilities that meet the TRI reporting requirements must file annual reports. This addition of the Federal facilities since 1994, while not adding a great amount of releases and other waste management, must be considered when conducting analyses of trends.

#### New transfer types

Beginning with the 1991 reporting year, facilities were required to report transfers off-site for the purposes of recycling and energy recovery. Prior to 1991, facilities were required to report only transfers to Publicly Owned Treatment Works (POTWs) and other off-site locations for treatment and disposal. Because of this change, total transfers for years prior to 1991 are not comparable to years since 1991.



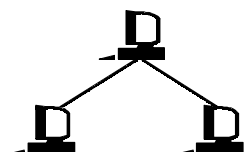
### **3.4. How consistent are the variables over space and time?**

TRI is EPA's only national-level database. Data collection, processing, and quality assurance are all handled by EPA headquarters. TRI also has a well documented publication strategy for both the documents and the data files. It was designed with computer public access as a major objective, and is indeed one of the EPA databases most widely used by the public.

As part of ongoing QA/QC procedures, EPA issues a number of guidance documents to ensure that facilities are using consistent and defensible methods of estimating their releases and to improve the accuracy and comparability of submitted TRI data. EPA guidance documents have a step-by-step, “how to”, approach that clearly illustrates and explains release estimation techniques as well as the reporting procedures for Form R and Form A.

However, while EPA does provide technical guidance to assist facilities in estimating emissions, it is important to remember that the data may be inconsistent across facilities at the same point in time or from one point in time to another at the same facility. Differences in releases and other waste management may be due to variations in measuring techniques such as monitoring, use of input/output models, engineering estimates, etc. In addition, differences in certain waste management data may be due to facilities differing in their interpretation of reporting requirements.

Other sources of inconsistencies from year to year include listings and delistings of chemicals, threshold changes, changes in the universe of facilities, and new transfer types as discussed in Section 3.3.



### **3.5. Can data from TRI be linked with information from other databases?**

The comparability of TRI with other databases and the ability to link data from it with information from other databases should be determined on a case-by-case basis. The TRI data may be linked (merged or queried) using these variables:

- Facility name, address, TRI facility identification, and Dun & Bradstreet number
- Parent company name
- TRI chemical identification and name
- EPA identification numbers (RCRIS ID number, NPDES permit number)
- SIC code
- City, county, State, and EPA Region of facility
- State and county FIPS code
- ZIP code
- Latitude and longitude

Any other database where data may be available for the same identification or spatial variables as TRI (shown above) may be compatible with TRI for linking information. For instance, the TRI database includes RCRIS and NPDES identification numbers that allows for linking to those databases.



### **3.6. How accurate are the data in TRI?**

The TRI program has instituted numerous data management principles to ensure the quality of reported and recorded data. The guidances mentioned above are initial steps in assuring quality data, in that they attempt to reduce the number of reporting errors. The increased use of magnetic media and electronic reporting,

as opposed to paper submissions that must be manually keyed into an electronic format, is another front line attempt to reduce errors on the part of the Agency. Many possible data errors are precluded by the data quality edits incorporated in the data entry software which EPA provides to facilities. EPA also performs computerized checks upon the data's arrival, and sends release value reports to submitters for their own review.

Concerning the accuracy of the actual release data, EPA has examined the data values reported by TRI facilities, both for the 1987 and 1988 and the 1994 and 1995 reporting periods. In both time periods, EPA found that many reported values were quite close to the re-estimated values. For example, in the more recent time period, on a facility-wide basis, total reported releases were within about 10% of the re-estimated releases for over half the facilities examined. In the earlier study, about three quarters of the individual reported values were accurate to within a factor of two, and that over-estimates and under-estimates occurred with roughly equal frequency. Some small percentage of reported values had "large magnitude errors", i.e. were wrong by more than a factor of ten, or were reported when they should not have been reported, or were incorrectly omitted.



### **3.7. What are the limitations of TRI?**

The section on trends includes some limitations of the TRI database caused by changes in the type of information collected in the years since its inception. These include changes in the chemicals, types of facilities, and threshold for reporting; and inclusion of additional information on waste management activities. Also, TRI covers only a portion of the universe of toxic chemicals (only listed chemicals) and only manufacturing sources of toxic chemicals releases. Accordingly, while TRI covers most major chemicals and large manufacturing plants, a local community may not get a complete inventory of the toxic chemicals present in its locality, especially if there are smaller facilities or non-manufacturing facilities in the locality. Similarly for large scale (national and State) level data aggregations, TRI will underestimate "all releases of toxic chemicals," so graphics and reports should state "Only TRI Listed Chemicals Reported." Limitations of TRI are outlined below:

- TRI does not encompass area (non-point) and mobile sources of toxic chemicals. Even among point sources, the program currently only applies to the manufacturing sector within Standard Industrial Classification (SIC) codes 20 through 39. While this is a significant sector of the industrial world handling toxic chemicals, there remain sources that are beyond current TRI coverage. TRI will expand coverage with the 1998 reporting year.
- Facilities with fewer than the equivalent of 10 full-time employees and facilities that do not meet the chemicals thresholds are not required to submit TRI reports.

- Data currently collected provides limited data on the life cycle of the chemicals used by facilities. Only very general information on chemical storage is provided. More detailed information on these issues is available under sections 311 and 312 of EPCRA. Thus other information must be appended to the TRI outputs in order to comprehensively assist communities and government to better evaluate facilities' source reduction and pollution prevention performance; focus emergency planning efforts related to transportation and storage of chemicals; identify amounts of toxic chemicals in commercial products; and address worker safety and health issues.
- TRI data alone cannot provide a complete picture of risk potential of adverse health and ecological effects. There is no information in TRI itself on the toxicity of the chemicals, extent of exposure, life cycle of chemicals used, population densities, and the conditions of the environment. These are all necessary ingredients for conducting a risk assessment. For example, small releases of highly toxic chemicals may present a greater risk than larger releases of less toxic chemicals. Direct releases, such as air emissions, may pose a greater threat to human health and the environment than more contained releases, such as underground injection to Class I wells. While not in TRI, the TRI program does make available toxicity information on many of the TRI chemicals.
- Reporting may be based on actual monitored data or on estimated data. While TRI does not mandate that facilities monitor their releases, those that do, must consider this monitored data. The statute allows facilities that do not monitor to provide reasonable estimates, subject to enforcement verifications. Variations between facilities can result from the use of different estimation methodologies. Facilities may also vary in their interpretation of the waste management reporting requirements. Therefore differences in quantities of chemicals in waste may reflect not only differences in actual quantities, but also differences in interpretations of reporting requirements. (See Section 3.2)
- Facilities report the total annual emissions of toxic chemicals (in pounds); an annual report does not indicate whether they release large amounts over a short period or small amounts every day throughout the year. The impact of the two types of releases will vary depending on the toxic effects of the chemicals.



### 3.8. How can I get information on TRI?

EPA offers the TRI database to the public in many forms.

***TRI User Support Service (TRI-US)*** provides general information, help in determining data product best suited for user needs, training and limited search services.

TRI User Support Services/EPA  
401 M Street, SW (MS-7407)  
Washington DC 20460  
Phone: (202) 260-1531  
Fax: (202) 401-2347  
Email: tri.us@epamail.epa.gov

### ***Federal Depository Libraries***

TRI products are distributed to a network of 1,400 public and academic libraries with over 700 receiving CD-ROMS. Contact your local library or the TRI User Support Service.

### ***Electronic Media (CD-ROMS and diskettes)***

US Government Printing Office  
Superintendent of Documents  
P.O. Box 371954  
Pittsburgh, PA 15250-7954  
Phone: (202) 512-1800  
Fax: (202) 512-2250  
Hours: 8:30 am - 4:00 pm (ET)

National Technical Information Service  
US Department of Commerce  
5285 Port Royal Road  
Springfield, VA 22161  
Phone: (800) 553-6847 or (703) 487-4650  
Fax: (703) 321-8547  
Email: info@ntis.fedworld.gov

### ***Online services***

EPA Internet Public Server offers information useful to both novice and experienced users of the TRI Database. It provides, in layman's terms, a description of what TRI is, how it can be used, a discussion of TRI and health issues, and much more.

<http://www.epa.gov/opptintr/tri>

Envirofacts, another EPA website provides an easy to use format for querying TRI and several other databases interactively. It contains the complete TRI dataset (1987-1996), along with query tools and online database user guides.

[http://www.epa.gov/enviro/html/tris/tris\\_overview.html](http://www.epa.gov/enviro/html/tris/tris_overview.html)

The National Library of Medicine (NLM) TOXNET System makes TRI accessible to concerned citizens and to businesses and organizations interested in environmental and public health issues. TOXNET offers state-of-the-art, user-

friendly, online searching. NLM also has ancillary data, such as toxicity data, useful in interpreting TRI reports. Online costs range from \$18-\$20 per hour. An NLM password is necessary. TOXNET is also currently available on the internet, on an experimental basis, without charge. For more information contact:

National Library of Medicine  
Specialized Information Services  
TRI Representative  
8600 Rockville Pike  
Bethesda, MD 20894  
Phone: (301) 496-6531  
Email: toxmail@tox.nlm.nih.gov  
*Hours: 7 days/week; 24 hours/day*

Right-to-Know Network (RTK NET), operated jointly by Unison Institute and OMB Watch, offers free access to TRI data. The data can be accessed through the internet.

<http://www.rtk.net>

For more information, contact:

RTK NET  
c/o The Unison Institute  
1742 Connecticut Avenue, NW  
Washington, DC 20009-1171  
Phone: (202) 797-7200  
Fax: (202) 234-8584  
Email : info@rtk.net

A variety of State, industrial, and environmental organizations have independently made TRI data available on the internet and through bulletin board services.

### ***Printed Media***

The TRI Information Kit is designed to educate a broad audience about the TRI. It contains a brochure, bookmark, poster, and other explanatory material. It is designed to answer the “who, what, when, why, where, and how” questions of TRI in clear, jargon-free language. Copies are free while supplies last. Request document number EPA-749-K-98-001. Contact:

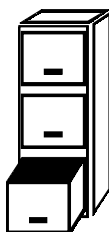
National Center for Environmental Publications and Information (NCEPI)  
P.O. Box 42419  
Cincinnati, OH 45242-2419  
Phone: (800) 490-9198 or (513) 489-8190  
Fax: (513) 489-8190

TRI User Support Services  
EPA  
401 M Street, SW (MS-7407)  
Washington DC 20460  
Phone: (202) 260-1531  
Fax: (202) 401-2347  
Email: tri.us@epamail.epa.gov

Public Data Release Reports from EPA provide detailed annual reports providing summaries, analyses, and annual comparisons of TRI data. Copies are free while supplies last.

NCEPI  
Phone: (800) 490-9198  
[www.epa.gov/opptintr/tri/access.htm](http://www.epa.gov/opptintr/tri/access.htm)

TRI User Support Services  
EPA  
401 M Street, SW (MS-7407)  
Washington DC 20460  
Phone: (202) 260-1531  
Fax: (202) 401-2347  
Email: tri.us@epamail.epa.gov



### **3.9. Is there documentation on TRI?**

#### ***Statutory Authority***

- US Code Title 42 The Public Health and Welfare Chapter 116 Emergency Planning and Community Right-To-Know
- Toxics Release Inventory: National Perspective
- Pollution Prevention and Right-to-Know in the Government, Executive Order 12856

#### ***Key Information***

- Categories of Released Chemicals: Reported to the Toxics Release Inventory
- Toxic Chemical Release Inventory Reporting Form R and Instructions, Revised 1996 Version
- RCRA/UST, Superfund, and EPCRA Hotline Training Module: Introduction to Toxics Release Inventory: Reporting Requirements, EPCRA Section 313; 40 CFR Part 372
- Toxics Release Inventory: List of Toxic Chemicals

#### ***Internal consistency***

- RCRA/UST, Superfund, and EPCRA Hotline Training Module: Introduction to Toxics Release Inventory: Estimating releases, EPCRA Section 313; 40 CFR Part 372
- Estimating Releases and Waste Treatment Efficiencies for the Toxic Chemical Release Inventory Form

- RCRA/UST, Superfund, and EPCRA Hotline Training Module: Introduction to Toxics Release Inventory: Pollution Prevention Act Requirements, EPCRA Section 313; 40 CFR Part 372
- Expanding Community Right-To-Know Recent Changes in the Toxics Release Inventory
- Toxic Chemical Release Inventory: Reporting Modifications Beginning With 1995 Reporting Year
- Guidance for Implementing Executive Order 12856
- Toxic Chemical Release Inventory Data Quality Checks to Prevent Common Reporting Errors on Form R
- Toxic Chemical Release Inventory: List of Toxic Chemicals within the Polychlorinated Alkanes Category and Guidance for Reporting
- Toxic Chemical Release Inventory: Guidance for Reporting Toxic Chemicals within the Polycyclic Aromatic Compounds Category
- Toxic Chemical Release Inventory: List of Toxic Chemicals within the Nicotine and Salts Category
- Toxic Chemical Release Inventory: List of Toxic Chemicals within the Strychnine and Salts Category
- Toxic Chemical Release Inventory: List of Toxic Chemicals within the Glycol Ethers Category
- Toxic Chemical Release Inventory: Reporting Modifications Beginning With 1995 Reporting Year
- Toxic Chemical Release Inventory: List of Toxic Chemicals within the Water Dissociable Nitrate Compounds and Guidance for Reporting

### ***Information Dissemination***

- 40 CFR Part 372 Toxic Chemical Release Reporting Community Right-To-Know
- State Fact Sheet: Toxics Release Inventory Public Data Release (1987-1996)
- Toxic Chemical Release Inventory: Public Data Release (1987-1996)
- Toxic Chemical Release Inventory: Public Data Release, Executive Summary 1993
- Toxic Chemical Release Inventory: Public Data Release, Executive Summary June 1996
- Toxic Chemical Release Inventory: Information Kit
- Toxic Chemical Release Inventory: 1987-1995 CD ROM users manual
- Chesapeake Bay Basin Toxics Loading and Release Inventory: Basinwide Toxics Reduction Strategy Commitment Report
- Chattanooga, TN/GA Metropolitan Statistical Area (MSA) Toxics Release Inventory: Geographic Information System (TRI-GIS) Comparative Risk Screening Analysis

### ***Release Inventory***

- Toxic Chemical Release Inventory: Reporting Modifications Beginning With 1995 Reporting Year
- Guidance for Implementing Executive Order 12856
- Toxic Chemical Release Inventory Data Quality Checks to Prevent Common Reporting Errors on Form R

- Toxic Chemical Release Inventory: List of Toxic Chemicals within the Polychlorinated Alkanes Category and Guidance for Reporting
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- Toxic Chemical Release Inventory: List of Toxic Chemicals within the Nicotine and Salts Category
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- Toxic Chemical Release Inventory: Public Data Release, Executive Summary 1993
- Toxic Chemical Release Inventory: Public Data Release, Executive Summary June 1996
- Toxic Chemical Release Inventory: Information Kit
- Toxic Chemical Release Inventory: 1987-1992 CD ROM users manual
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- Chattanooga, TN/GA Metropolitan Statistical Area (MSA) Toxics Release Inventory: Geographic Information System (TRI-GIS) Comparative Risk Screening Analysis

## **APPENDIX A - PROJECT OVERVIEW**

### **Introduction**

The *Center for Environmental Information and Statistics (CEIS)* is conducting a review of major EPA databases to assess their potential suitability for various secondary uses. Most EPA databases serve as a repository for the data produced by a specific data collection activity. Most of these data collection activities were instituted to serve a particular and specific purpose. Secondary use of the data involves their use in analyses other than those originally planned. The CEIS review examines the degree to which major EPA databases can meet the varying demands of a wide range of information users, including community groups, non-governmental organizations, and local, State and Federal agencies. In conducting this review of each major database, the CEIS will consider both (1) data quality and (2) the potential for integration of data in one database with similar data from other EPA databases.

### **EPA Databases**

CEIS is reviewing 31 major EPA databases. These include the databases most heavily relied on inside and outside of EPA for information on the current state of the environment, on changes over time, and on the nature of the specific actions being taken by EPA and its counterpart agencies at the State and local level to protect and improve environmental quality. The 31 major databases under review are:

#### **OFFICE OF WATER**

- Storage and Retrieval of Water Quality Information (STORET X)
- Safe Drinking Water Information System (SDWIS)
- Water Body System
- Reach File (RF3) and the National Hydrography Dataset (NHD)
- Ocean Data Evaluation System (ODES)
- Clean Water Needs Survey (NEEDS)
- Environmental Monitoring Methods Inventory (EMMI)
- Information Collection Rule

#### **OFFICE OF AIR**

- Aerometric Information Retrieval System - Air Quality Subsystem (AIRS-AQS)
- Emissions Tracking Subsystem (ETS) - Acid Rain Program
- Aerometric Information Retrieval System - AIRS Emission Subsystem (AIRS-AES)
- Title VI Allowance Tracking System
- Environmental Radiation Ambient Monitoring System (ERAMS)
- Findings and Required Elements Data System (FREDs)
- Sample Tracking and Data Management System (STDMS)

## **OFFICE OF SOLID WASTE AND EMERGENCY RESPONSE**

- Resource Conservation and Recovery Information System (RCRIS)
- Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS)
- Biennial Reporting System (BRS)

## **OFFICE OF POLLUTION PREVENTION AND TOXIC SUBSTANCES**

- Toxics Release Inventory (TRI)
- National Pesticide Information Retrieval System (NPIRS)
- Chemicals in Commerce Information System (CICIS)

## **OFFICE OF ENFORCEMENT AND COMPLIANCE ASSURANCE**

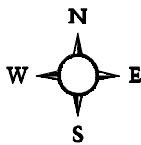
- Permit Compliance System (PCS)
- Aerometric Information Retrieval System - AIRS Facility Subsystem (AIRS-AFS)
- Compliance Subsystem of CERCLIS
- Compliance Subsystem of RCRIS
- National Compliance Database (NCDB)
- Waste International Tracking System (WITS)
- Enforcement Docket (DCK)
- National Asbestos Registry System (NARS)
- Section Seven Tracking System (SSTS)
- Compliance Subsystem of SDWIS

## **Review Process**

These reviews cover several dimensions including the statistical qualities of the record data, existence and adherence to monitoring and data compilation protocols, and usable guidance documentation. The reviews will be based on published documentation, information provided by the Program Office responsible for the databases, statistical analysis conducted by the CEIS, and (where available) case studies conducted by outside organizations involving use of the databases.

In order to present the review in a user-friendly manner, the CEIS plans to organize the information in a uniform format for all databases. After an initial summary description of the database, all relevant information will be presented as answers to nine key questions that a user is likely to ask in reviewing the database to assess its suitability.

**A - Z**



### **1. How comprehensive is the database?**

Identifies the kinds of information contained in the database (e.g. types of pollutants, facilities, permits, and acquisition methods).

### **2. Can the database be used for spatial analysis?**

Indicates whether the data are available at each of various geographical scales such as ZIP code, latitude and longitude, county code, State code, etc.

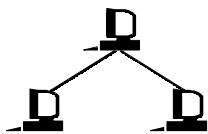
### **3. Can the database be used for temporal analysis?**

Shows if the data are collected on a fixed schedule (daily, monthly, yearly, etc.) and if the data are sufficiently consistent over time to allow period-to-period comparisons.



#### **4. How consistent are the variables over space and time?**

Indicates the degree of internal consistency allowing comparisons across space (facilities, Regions, etc.) and over time (monthly, yearly, etc.)



#### **5. Can data be linked with information from other databases?**

Provides information that can be used to determine if data can be linked with other databases based on common characteristics such as facility identification numbers, latitude and longitude, geographical codes, etc.



#### **6. How accurate are the data?**

Information from data quality checks performed by the Program Office as well as from statistical analysis performed by the CEIS appears here.



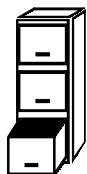
#### **7. What are the limitations?**

Each of EPA's databases has a primary purpose for which it was developed and is maintained. As the databases are reviewed for suitability for alternate uses, it is important to understand the constraints and limitations of the database.



#### **8. How can I get information?**

Identifies the formats in which the database is available such as printed form, diskettes, CD-ROM, online access etc., along with names, addresses, and phone numbers to contact for detailed information.



#### **9. Is there documentation?**

A quality database requires documentation to support it, such as information on data collection methods, quality assurance mechanisms, data management, users' guides, and information dissemination. Details on the availability of such documentation appears here.